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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,421	11/14/2001	Ji Hyun Hwang	MRE-0041	7045

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EXAMINER	
NGUYEN, BINH AN DUC	
ART UNIT	**PAPER NUMBER**
3713	

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/987,421	HWANG ET AL.	
	Examiner	Art Unit	
	Binh-An D. Nguyen	3713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The Preliminary Amendment and Information Disclosure Statement filed in Papers No. 2 and 3, November 14, 2001 have been received. According to the Amendment, claims 4, 7-8, 14, 15, and 19-20 have been amended. Currently, claims 1-29 are pending in the application. Acknowledgment has been made.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed features of a plurality of transfers being moved in the X and Y axis directions by an X-Y gantry installed on a base frame, and discharging the printed circuit board to the plurality of transfers when the mounting of the parts is finished (claims 1 and 10); conveyer width adjusting rollers for guiding the conveyer guide frames when adjusting the width of the conveyer guide frames according to the width of the printed circuit board, and conveyer lifting members installed on the inside of the conveyer guide frames for mounting the parts to the printed circuit board or discharging the parts (claims 7 and 19); and the steps of surface mounting methods (claims 22-29) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Note that, Figures 4 and 6 show regular rollers 31b and 41b, not width adjusting rollers.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the features of a plurality of transfers being moved in the X and Y axis directions by an X-Y gantry installed on a base frame (page 7, lines 1-4; page 14, lines 12-16), and discharging the printed circuit board to the plurality of transfers when the mounting of the parts is finished; conveyer width adjusting rollers for guiding the conveyer guide frames when adjusting the width of the conveyer guide frames according to the width of the printed circuit board (page 12, lines 13-19); the conveyer driving units 31d and 41d generate the driving force for carrying the printed circuit board lifted/lowered to the predetermined height (page 12, lines 23-26) as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The disclosure is objected to because of the following informalities:

The semicolon (;) (page 5, lines 24 and 27; page 6, lines 3, 5, 8, and 10) and the phrase "; and" (page 6, line 13) should be replaced with a period (.).

On page 13, line 15, numeral "61c" should be changed to "61".

On page 16, line 8, numeral "71" should be changed to "71a".

On page 16, line 22, numeral "72" should be changed to "81".

Appropriate correction is required.

5. Claims 1-21 are objected to because of the following informalities:

In claim 1, line 5, the recited term "a discharged printed circuit" should be changed to a discharged printed circuit board".

In claims 1 and 10, the recited term "discharging the same" (lines 14 and 15, respectively) should be changed to "discharging the printed circuit board".

In claims 6 and 18, the recited term "bottom of the first conveyer" (line 6) should be changed to "bottom of the second conveyer" for consistency.

In claims 8 and 20, the recited phrase "one among" (line 3) should be changed to "from a group consisting of".

In claims 9 and 21, the recited phrase "one between" (line 3) should be changed to "from a group consisting of".

In claims 28 and 29, the recited term "loading the same" (claim 28, line 15; and claims 29, lines 11-12 and 22, respectively) should be changed to "loading the printed circuit board".

Appropriate correction is required.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not disclose how a plurality of transfers being moved in the X and Y axis directions by an X-Y gantry installed on a base frame (claims 1 and 10); and how to adjust the width of the conveyer guide frames according to the width of the printed circuit board, and conveyer lifting members installed on the inside of the conveyer guide frames for mounting the parts to the printed circuit board or discharging the parts (claims 7 and 19).

Note that, in the first embodiment of the applicants' invention (Application's Figures 3-4), the plurality of transfers 20 and 50 are installed at two ends of the base frame 11 and they transfer or load the printed circuit board horizontally (in the Y-axis) to/from the conveyer units 30 and 40 using the belts 23 and 53 (specification, page 8, line 27 to page 10, line 17); and the conveyer units 30 and 40 receive or discharge the printed circuit board by moving in the X-axis to align with the transfer units 20 and 50 (specification, page 13, line 2 to page 14, line 2). Accordingly, there is no driving mechanism to move the transfer units 20 and 50 and they seem to be stationary. Thus, no involvement of the X-Y gantry has been exerted on the transfer units 20 and 50.

In the second embodiment of the applicants' invention (Application's Figures 5-8c) the plane motion transfer units 70 and 80 move in X-Y directions (plane motion) by

plane driving devices 72 an 82. Again, no involvement of the X-Y gantry has been exerted on the plane motion transfer units 70 and 80.

Further, the limitations of "conveyer width adjusting rollers...for guiding the conveyer guide frames when adjusting the width of the conveyer guide frames according to the width of the printed circuit board, and conveyer lifting members installed on the inside of the conveyer guide frames for mounting the parts to the printed circuit board or discharging the parts" (claims 7 and 19) have not been clearly disclosed. Note, the specification does not show how the guide frames being adjusted; rather, it only discloses the conveyer units being moved to align with the width of the transfer units (first embodiment, Figures 3-4), and either or both transfer units or conveyer units being moved corresponding to each other's width (second embodiment, Figures 5-8c) for loading/discharging the printed circuit board (Specification, page 11, line 4 to page 13, line 21). Furthermore, the conveyer lifting members, as disclosed in the specification, are used to lift and lower the printed circuit board in the parts mounting process (Specification, page 12, lines 19-26). They are **not** used for mounting the parts to the printed circuit board or discharging the parts as claimed.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claimed features of a plurality of transfers being moved in the X and Y axis directions by an X-Y gantry installed on a base frame (claims 1 and 10); and conveyer width adjusting rollers for guiding the conveyer guide frames when adjusting the width of the conveyer guide frames according to the width of the printed circuit board, and conveyer lifting members installed on the inside of the conveyer guide frames for mounting the parts to the printed circuit board or discharging the parts (claims 7 and 19) have not been clearly disclosed in the specification as stated above.

The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

In claim 1, the recited limitation of "a plurality of transfers...loading a discharged printed circuit by a head unit for sucking parts supplied from a parts supply unit and mounting the sucked parts on a printed circuit board" (lines 2-8) is vague and indefinite. It is unclear how a head unit loading the circuit board from the transfers.

In claim 3, the recited term "the rotating motor" (line 7) lacks antecedent basis.

In claim 8, the recited term "(the) second horizontal driving unit(s)" (line 2) lacks antecedent basis.

In claim 10, the recited limitation of "a plurality of plane motion transfer units... discharge the printed circuit board for mounting parts by a head unit for sucking parts..." (lines 2-9) renders the claim vague and indefinite since it is unclear how a plurality of plane motion transfer units discharge the printed circuit board by a head unit.

In claim 14, the recited terms "the rotation force" and "the rotating motor" (lines 6-7) lack antecedent basis.

In claim 15, the recited term "(the) second plane driving device(s)" (line 2) lacks antecedent basis.

In claim 20, the recited term "(the) second horizontal driving unit(s)" (line 2) lacks antecedent basis.

In claim 22, the recited limitations of "mounting parts on the printed circuit board carried to the second conveyer unit by control of the controller and carrying the printed circuit board loaded on the first transfer to the first conveyer unit when the printed circuit board is carried to the second conveyer unit; and discharging the printed circuit board on which parts have been mounted to the second transfer by control of the controller and carrying the printed circuit board carried to the first conveyer unit when the mounting of parts on the printed circuit board in the second conveyer unit is finished" (lines 10-21) are vague and confusing. It is unclear how may circuit boards are being referred to.

Further, in claim 22, the recited term "the first transfer" (lines 3-4) lacks antecedent basis.

Note that, the applicants may wish to use the terms such as first printed circuit board, second printed circuit board, third printed circuit board, etc. in the claims for clarity.

Claim 25 is vague and indefinite because it is unclear what being loaded on the first plane motion transfer (lines 5-6). It appears that the applicants mean to load the

printed circuit board on the first plane motion transfer unit to the first conveyer unit. Further, the recited term "the second plane motion transfer unit" (claim 25, lines 6-7 and claim 26, lines 4-5) appears to mean "the second conveyer unit".

Claim 27 is vague and indefinite since it is unclear what is being moved. It appears that the first plane motion transfer unit is being referred to.

Note that, as best understood, the limitation of "discharging the printed circuit board to the plurality of transfers (or plane transfer units) when the mounting of the parts is finished" (claims 1 and 10) is resulted from both forward and reverse directions of the transfers (or plane transfer units) and the conveyer units.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-10 and 16-25, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. (6,572,702) in view of Doyle (6,032,577), and further in view of Park (5,517,748).

Freeman et al. discloses surface mounting system and method comprising: a plurality of transfers (infeed and outfeed conveyors) supplying a printed circuit board (for mounting the sucked parts by a head unit) or loading a discharged printed circuit; and a plurality of conveyers (512a, 512b) (Figures 7a-7h) being installed to be moved horizontally in a predetermined direction at a predetermined position and carrying the

printed circuit board supplied from the plurality of transfers (infeed and outfeed conveyors moving in either direction) to a parts mounting work position (mounting parts using placement machine 118 (8:29-32, 10:40-43) and discharging the printed circuit board to the plurality of transfers (resulted from both forward and reverse directions of the conveyor system, 9:8-16) when the mounting of the parts is finished; wherein the plurality of transfers comprises a first transfer (infeed conveyor) and (the first transfer) supplies the printed circuit board to the plurality of conveyer units (512a, 512b) which moved horizontally in a predetermined direction; and a second transfer (outfeed conveyor) loads the printed circuit board discharged from the plurality of conveyer units (installed to be moved horizontally in a predetermined direction) to the outside of the surface mounting device; the plurality of conveyers comprise a first conveyer unit (512a) installed to be moved horizontally in a predetermined direction at a predetermined position, for thereby carrying the printed circuit board supplied from the first transfer (infeed conveyor); and a second conveyer unit (512b) installed to be moved horizontally in a predetermined direction at a predetermined position, for thereby discharging the printed circuit board carried from the first conveyer unit to the second transfer (outfeed conveyor) (Figures 7a-7h); the conveyer comprises conveyer guide frames (Doyle's 102a, 102b) for guiding each printed circuit board; conveyer width adjusting rollers (for driving conveyor belts 103a, 103b; Doyle's Figures 4-5), installed at a predetermined position of the conveyer guide frames, for guiding the conveyer guide frames; adjusting the width of the conveyer guide frames according to the width of the printed circuit board (Doyle, 6:2-10); conveyer lifting members (Doyle's 108a, 108b, 110a, 110b)

installed on the inside of the conveyer guide frames (for lifting up the printed circuit board) for mounting the parts (to the printed circuit board) or (lower the printed circuit board) for discharging (from the conveyer to the outfeed) (Doyle, 5:12-62); and first conveyer driving units (conveyor belts 103a, 103b with driving mechanism; Doyle's Figures 4-5) installed at an inner sidewall of the first conveyer guide frames for carrying the printed circuit board; carrying (moved in plane motion in a predetermined direction) a (first) printed circuit board (522) and loaded on the first transfer (in plane motion) (infeed conveyor) to a first conveyer unit (514a)(Fig. 7c) (by control of a controller); carrying the (first) printed circuit board (522) to a second conveyer unit (Fig. 7d)(from the first conveyer unit); mounting parts on the (first) printed circuit board (Fig. 7e)(while on the second conveyer unit), and carrying a (second) printed circuit board (524) to the first conveyer unit (Fig. 7g) when the mounting of parts on the first printed circuit board (522) in the second conveyer unit is finished; and discharging the (first) printed circuit board (522) (Fig. 7h), on which parts have been mounted, to the second transfer (outfeed conveyor); wherein in the step of carrying the (first) printed circuit board to the second conveyer unit by the first conveyer unit, it is also possible to mount parts on the printed circuit board carried to the first conveyer unit by control of the controller and then carry the printed circuit board to the second conveyer unit (Fig. 7d-7e); wherein in the step of mounting parts on the (first) printed circuit board (Fig. 7e)(while on the second conveyer unit), and carrying a (second) printed circuit board (524) to the first conveyer unit (Fig. 7g), the (first) printed circuit board on which parts are mounted is discharged to the second transfer (outfeed conveyor), and the (second) printed circuit board loaded

on the first transfer can be carried to the first conveyer (Fig. 7g) when parts have been mounted on the (first) printed circuit board (at the second conveyer unit). Note that, the limitations of first and second transfers comprise transfer guide frames for guiding the printed circuit board; a plurality of transfer rollers installed at a predetermined interval from each other at side walls of the transfer guide frames and rotated by receiving the rotation force generated from the rotating motor for carrying the printed circuit board; and belt members installed between the plurality of transfer rollers and driven by the rotation of the plurality of transfer rollers, for thereby carrying or loading the printed circuit board (claim 3) are similar to the structure of the conveyor system of Doyle (Figs.11-13). Further note that, the limitations of conveyers being installed to be moved horizontally in a predetermined direction at a predetermined position on a base frame; a first horizontal driving unit installed on the bottom of the first conveyer and at a predetermined position of the base frame for thereby moving horizontally the first conveyer in a predetermined direction (claims 5 and 17); and a second horizontal driving unit installed on the bottom of the second conveyer and at a predetermined position of the base frame for thereby moving horizontally the second conveyer in a predetermined direction (claims 6 and 18) are inherent from the conveyor system and the moving front and back conveyors (512a, 514a) of Freeman et al. (Figures 7a-7h). Note, Freeman et al. states at column 5, lines 58-62, that the conveyor system used is the one disclosed by Doyle (6,032,577). It would have been obvious to use a conveyor system as taught by Doyle with the apparatus of Freeman since Freeman teaches that the conveyor of Doyle should be used.

Freeman et al. does not disclose the limitations of a plurality of transfers being moved in the X and Y axis directions of a base frame at which an X-Y gantry installed. Park, however, teaches a printed circuit board transferring apparatus comprising a plurality of transfers (40, 60) being moved in the X and Y axis directions of a base frame at which an X-Y gantry installed (Figures 2-3).

Regarding the limitations of the first and second horizontal driving units are any one from a group consisting a ball screw driving device, a timing belt driving device, and a linear motor (claims 8 and 20); wherein the linear motor is any one from a group consisting a coil mover linear motor and a permanent magnet mover linear motor (claims 9 and 21); carrying and loading the printed circuit board moved in plane motion, by control of a controller, in a predetermined direction and at a predetermined time interval (claims 10 and 25), these limitations are notoriously well known in the industry.

Further, regarding the limitation of installing the transfers at each end of the base frame (of the mounting device)(claims 1 and 10), it is obvious in the circuit board manufacturing industry to install or connect the transfers at both ends of the mounting machine for input and output circuit boards to and from the circuit mounting machine.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide Freeman et al.'s electronic assembly system a plurality of transfers capable of moving in the X and Y axis directions on a base frame, as taught by Park, to come up with a faster circuit mounting system thus bring forth productivity and lower manufacturing cost.

12. Claims 26-29 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh-An D. Nguyen whose telephone number is 703-305-5713. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Teresa Walberg can be reached on 703-308-1327. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1148.

BN

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